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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/729,725

12/04/2003

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03/18/2009

EXAMINER

KASZTEJNA, MATTHEW JOHN

ART UNIT

PAPER NUMBER

3739

MAIL DATE

DELIVERY MODE

03/18/2009

PAPER

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* JOHN PAUL WEIRICH

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Appeal 2009-0941  
Application 10/729,725  
Technology Center 3700

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Decided:<sup>1</sup> March 18, 2009

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Before ERIC GRIMES, LORA M. GREEN, and  
RICHARD M. LEOVITZ, *Administrative Patent Judges*.

GREEN, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the Examiner's final rejection of claims 21-28. We have jurisdiction under 35 U.S.C. § 6(b).

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<sup>1</sup> The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, begins to run from the decided date shown on this page of the decision. The time period does not run from the Mail Date (paper delivery) or Notification Date (electronic delivery).

## STATEMENT OF THE CASE

The claims are directed to a capsule imaging system. Claim 21 is representative of the claims on appeal, and reads as follows:

21. A capsule imaging system comprising:
- imaging means including an ultra-wideband sensor for imaging at least a portion of a gastro-intestinal (GI) digestive tract in a subject, by emitting and receiving a plurality of electromagnetic signals at frequencies in the radio wave spectrum above one gigahertz;
  - a communications means for communication with at least one antenna outside of the GI digestive tract of the subject, including at least one radio transmitter;
  - a controlling circuit to control a plurality of communication operations by the radio transmitter, and to control at least one operation of the imaging means;
  - a capsule to enclose the imaging means, communication means, and the controlling circuit; and
  - a power supply inside the capsule to supply electrical power to the communication means and the imaging means.

The Examiner relies on the following evidence:

Sarr	US 5,668,555	Sep. 16, 1997
Fujita	US 2003/0085994 A1	May 8, 2003

We affirm.

## ISSUE

The Examiner concludes that claims 21-28 are rendered obvious by the combination of Fujita and Sarr.

Appellant argues that the ordinary artisan would not have combined the ultra-wideband (UWB) imaging device of Sarr with the capsule imaging system of Fujita to arrive at the claimed capsule imaging system.

Thus, the issue on Appeal is: Has the Examiner established that the ordinary artisan would have combined the UWB imaging device of Starr with the capsule imaging system of Fujita to arrive at the claimed capsule imaging system?

### FINDINGS OF FACT

FF1 The invention relates to “in vivo capsule imaging devices utilizing ultra-wideband (UWB) radar sensors.” (Spec. 1.)

FF2 The Specification notes that “capsule-shaped devices holding a CCD video camera, transmitter, and power supply, . . . have been used to image the GI tract,” where the device “takes visible-light pictures of the interior wall of the GI tract then transmits picture signals to a receiving device worn by the subject.” (*Id.* at 2.)

FF3 According to the Specification, “[a]nother category of imaging devices that use frequencies different from x-rays, is ultra wideband (UWB) devices,” which “use UWB radar sensor circuits that operate in the 3.1-10.6 Ghz range.” (*Id.*)

FF4 The Specification teaches further:

The size of an UWB radar sensor can be reduced enough so it can be encapsulated in a small swallowable capsule structure, by forming most of the electrical circuitry on an integrated circuit chip. This miniaturization of circuitry has been demonstrated by Time Domain Corporation with its PulsOn chipset, and the Aether4 receiver and Driver2 transmitter chips by Aether Wire and Location Inc.

(*Id.*)

FF5 The Examiner rejects claims 21-28 under 35 U.S.C. § 103(a) as being obvious over the combination of Fujita and Starr (Ans. 4).

FF6 The Examiner cites Fujita for teaching a capsule imaging system substantially as claimed, except the Examiner finds that Fujita is “silent with respect to the imaging means including an ultra-wideband sensor system at frequencies in the radio wave spectrum substantially between 3.1 and 10.6 gigahertz.” (*Id.*)

FF7 Fujita specifically teaches a capsule imaging system that uses a white-color LED around an objective lens, wherein image signals are sent to a receiver (Fujita, ¶52).

FF8 Fujita also teaches that the capsule imaging sensor may comprise a pH sensor, a temperature sensor, a pressure sensor, a light sensor, or a sensor for detecting hemoglobin (*id.* at ¶173). Fujita teaches further that the capsule-type medical device may incorporate an ultrasonic wave probe instead of the sensor (*id.* at ¶176).

FF9 The Examiner cites Starr for teaching an imaging system and apparatus that “implements ultra-wideband radar motion sensors to provide three-dimensional images in real-time.” (Ans. 4-5.)

FF10 The Examiner finds that Starr teaches that one objective of the invention disclosed by Starr is to provide an imaging system for use in the biological sciences (*Id.* at 5).

FF11 Starr teaches “an imaging system which includes an ultra-wideband rapid sampler radar circuit which produces, transmits and receives an electrical voltage pulse.” (Starr, col. 2, ll. 32-35.)

FF12 According to Starr, the imaging system

has no adverse biologic impact, includes accurate three-dimensional structure localization with minimal distortion capable of use without contrast media, provides real time mass or component imaging both for study, diagnosis, and intervention, and provides a cost estimated to be less than 10% of conventional CT scanning or MRI systems.

(*Id.* at col. 1, ll. 27-33.) In addition, the system “provides three dimensional images in real-time.” (*Id.* at ll. 38-39.)

FF13 Starr teaches ultra-wideband microchip devices that “emit radar signals with a multiple-magnitude safety factor and are capable of identifying direction, distance, and density.” (*Id.* at col. 2, l. 66-col. 3, l. 2.)

FF14 Starr teaches that each radar circuit is included in a microchip, and also teaches that the microchips may be provided in an array on a substrate (*Id.* at col. 4, l. 64-col. 5, l. 13; *see also* Figure 4).

FF15 Starr also teaches that “the present invention allows a user to select/isolate a single radar signal . . . from a particular radar circuit for ‘magnification’ thereof.” (*Id.* at col. 4, ll. 40-43.)

FF16 Starr teaches further that “a microchip is capable of detecting differences in tissue density in the order of ½ millimeter from 2 inches to 30 inches thereby only requiring a single microchip.” (*Id.* at col. 5, ll. 8-10.)

FF17 The Examiner concludes that “[i]t would have been obvious to one skilled in the art at the time the invention was [made] to use an ultra-wideband imager in the apparatus of Fujita et al. to provide an alternate imaging means capable of producing an image having accurate three-dimensional structure localization with minimal distortion as taught by Starr.” (Ans. 5.)

## PRINCIPLES OF LAW

The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) the level of ordinary skill in the art; (3) the differences between the claimed invention and the prior art; and (4) secondary considerations of nonobviousness, if any. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966).

“The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, \_\_\_, 127 S. Ct. 1727, 1739 (2007).

If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.

*Id.* at \_\_\_, 127 S. Ct. at 1740. It is proper to “take account of the inferences and creative steps that a person of ordinary skill in the art would employ.”

*Id.* at \_\_\_, 127 S. Ct. at 1741. *See also id.* at \_\_\_, 127 S. Ct. at 1742 (“A person of ordinary skill is also a person of ordinary creativity, not an automaton.”). “In determining whether obviousness is established by combining the teachings of the prior art, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.” *In re GPAC Inc.*, 57 F.3d 1573, 1581 (Fed. Cir. 1995) (internal quotations omitted).

## ANALYSIS

Appellant notes that “the present invention comprises an UWB imaging sensor enclosed within a capsule powered by a battery and able to communicate with a receiver outside the body of the subject by means of a transmitter.” (App. Br. 7.) According to Appellant, “the miniaturization of UWB circuitry . . . enabled it to be enclosed in a swallowable capsule,” and “UWB imaging is distinguishable from visible light [in] . . . its ability to penetrate through tissues and ‘see below the surface’ to image hidden features.” (*Id.*)

Appellant then argues that the USPTO examined and granted claims 1, 2, and 3 of U.S. Patent No. 7,061,523 to Fujita, which describes a visible light capsule endoscopy device, wherein the frequency of the sensor being used was changed from infrared to visible light (App. Br. 9). According to Appellant, similar rules of judgment should be applied in this case, wherein the “frequency of the sensor is similarly changed from the visible light spectrum to the UWB spectrum.” (*Id.*)

Moreover, Appellant asserts, Fujita teaches using the visible light portion of the spectrum, not an ultra-wideband (UWB) sensor as claimed (*id.* at 10). At the time of invention, Appellant argues, “UWB imaging apparatus and devices were very large,” and “UWB imaging devices were very large, like the device patented by Starr.” (*Id.* at 11.) Thus, Appellant asserts, “the juxtaposition of a large UWB imaging device with a small capsule device is not natural or obvious.” (*Id.*)

Appellant argues further that Fujita claims  
many other types of sensors besides visible light sensors, and  
even claims the use of a UWB radio for communication means,



Therefore, it is clear that Fujita et al. were fully aware of UWB technology at the time they made their invention. Nevertheless, they did not claim an UWB imaging sensor, even though all they had to do was add one additional claim, to the several dozen others, in their patent application to cover it.

(*Id.* at 11-12.)

Appellant's arguments have been carefully considered, but are not deemed to be convincing. Fujita teaches a capsule imaging system substantially as claimed (FF16), except that it does not teach the use of a UWB sensor. While Fujita teaches the use of visible light to visualize the GI tract (FF7), Fujita also teaches that other sensors and systems may be used, such as a pH sensor, a temperature sensor, a hemoglobin sensor, or an ultrasonic wave probe for imaging (FF8). Starr teaches an imaging system that uses a UWB sensor (FF9). Specifically, Starr teaches that microchip devices that emit radar signals are known (FF13), and that signals from a single microchip are capable of detecting differences in tissue density in the order of ½ millimeter from 2 inches to 30 inches thereby requiring only a single microchip (FF16).

Thus, we conclude that the Examiner has set forth a prima facie case of obviousness, and agree that it would have been obvious to the ordinary artisan to use an ultra-wideband microchip as taught by Starr in the capsule imaging apparatus of Fujita in order to provide an alternate imaging means capable of producing an image having accurate three-dimensional structure localization with minimal distortion (*see* FF17).

As to Appellant's arguments regarding allowance of the U.S. Patent No. 7,061,523 to Fujita, each application is judged on its own merits, and

thus allowance of that patent has no bearing on the merits of the instant application.

We also do not find Appellant's argument regarding the miniaturization of UWB circuitry that enabled it to be enclosed in a swallowable capsule, such as that taught by Fujita, and that UWB imaging devices were very large, like the device patented by Starr, sufficient to rebut the Examiner's prima facie case of obviousness. Starr teaches that microchips incorporating a radar circuit were known (FF13), which is supported by the Specification, which teaches that the miniaturization of a UWB radar sensor has been demonstrated (FF4). In addition, Starr teaches that imaging data may be received from a single radar circuit, *i.e.*, microchip (FF15, FF16), thus providing a reasonable expectation of success of receiving imaging data from a single radar circuit from a capsule imaging system, such as the system taught by Fujita.

Finally, Appellant's argument that Fujita was aware of UWB technology, but did not teach the use of a UWB sensor, is not convincing on the issue of obviousness. If Fujita had disclosed a capsule imaging system using a UWB sensor, the reference would have anticipated the instantly claimed invention, and not rendered it obvious. If we were to accept such an argument, it would read the obviousness analysis out of the patent laws.

### CONCLUSION(S) OF LAW

We therefore conclude that the Examiner has established that the ordinary artisan would have combined the UWB imaging device of Starr

with the capsule imaging system of Fujita to arrive at the claimed capsule imaging system.

We thus affirm the rejection of claims 21-28 under 35 U.S.C. § 103(a) as being obvious over the combination of Fujita and Starr.

#### TIME PERIOD FOR RESPONSE

Appellant, if dissatisfied with the decision, may request rehearing, *see* 37 C.F.R. § 41.52, or appeal the decision to our reviewing court, the U.S. Court of Appeals for the Federal Circuit, *see* 35 U.S.C. § 144, or to the U.S. District Court for the District of Columbia, *see* 35 U.S.C. § 145.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED

Ssc:

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